

# CHEMICAL ENGINEERING

Spring

2003

## John Butt '56 Inducted into Thomas Green Clemson Academy

One of the Chemical Engineering department's most distinguished graduates, **Dr. John Butt**, pictured here with Dean Tom Keinath, was inducted into the elite membership of the Thomas Green Clemson Academy Feb. 20. The academy recognizes the outstanding contributions of Clemson engineering alumni to the engineering profession and to society.



Recognized as an international expert in the field of reaction engineering and in particular the area of catalyst deactivation, Professor Butt received his master's and doctoral degrees from Yale University where, as a member of the faculty, he also served as a resident fellow and assistant master at Calhoun College, named for John C. Calhoun. He joined the faculty of Northwestern University in 1969, where he was Walter P. Murphy Professor of Chemical Engineering from 1981 until his retirement in 1987. (See story on P. 6.)

## The Changing Face of Chemical Engineering

The graduates who received their diplomas on May 9 walked across the stage at Littlejohn Coliseum and into a profession greatly changed from that which John Butt and his classmates encountered.

"Most graduates are walking into a new job," said Department Chair Jim Goodwin. "But this group of students, perhaps more than any before, will be seeing unprecedented changes in the nature of the work they will be doing."

In the past, the majority of jobs were in the petrochemical industry. Over the past decade, however, many new careers have opened up to Chemical Engineering graduates, and the profession likely will continue to diversify. Bioengineering offers many opportunities for chemical engineering graduates, as do medicine and the law. There will be even more diversification in the future. The department's newest faculty member, Assistant Professor Andrew Metters, notes that the work he is doing is nothing like what he expected to be doing when he chose chemical engineering as a career. (See article on p. 3.)

These changes in the profession, which bring a broader field of careers from which to choose, should be welcomed by students, especially given the current economic and employment climate.

What will the future hold for our graduates? The short answer is *change*. The more complex answer, and the harder one to plan for, is that we cannot really know. We can only keep our collective ear to the ground, pay attention to what we hear from those in leadership roles among the alumni as well as reports from our most recent graduates, and remain flexible in order to meet whatever exciting challenges lie ahead.

## Class of 2003- May Commencement

The 55 Chem E students who graduated at the 9:30 a.m. commencement May 9 were among the first group to receive their diplomas in the newly refurbished Littlejohn Coliseum. This year's class included two Master of Science recipients, Daniel Richard Bosak of Bellmawr, NJ; and Ronnie Twain Pigott of Tylertown, MS; and 53 Bachelor of Science recipients.

Graduating *magna cum laude*, with a GPR between 3.7 and 3.89, Angela Rae Manning of Simpsonville, SC, was first in the class. Other *magna cum laude* graduates were Robert Atkinson Darby III of Mt. Pleasant, SC; Nathan Gregory Kenney of Sidney, ME; and Christopher Andrew Shuler of Columbia, SC.

Thirteen students graduated *cum laude*, with a GPR of 3.4-3.69. They are Eric Michael Brannen of Chapin, SC; Jean Marie Bryan of Greenwood, SC; Jason Robert Gaudet of Peabody, MA; Leo Angelo Gumapas of North Charleston, SC; Lindsey Brooks Jerrim of Duluth, GA; Daniel Joseph Meservy of Mt. Pleasant, SC; Laura Margaret Phipps of Roanoke, VA; Rebecca Lynne Presley of Alpharetta, GA; Christopher Michael Rigdon of Charleston, SC; Lindsay Teal Sims of Florence, SC; Jason Lee Stone of Piedmont, SC, who also graduated with departmental honors; Christopher David Von Ins of Rock Hill, SC; Robert Anthony Walker of Greer, SC; and Thea Joy Warringer of Summerville, SC. (Photos inside.)



### A NOTE FROM THE CHAIR

Every May we celebrate a rite of passage for our graduates with the commencement ceremony. The word “commencement” means beginning, and for these new graduates, this even marks the beginning of a new phase of their lives. For some it means a continuation of their studies, whether in a traditional chemical engineering graduate program or in another field that offers chemical engineers exciting career opportunities, such as medicine or the law.

For the faculty, this time represents not just the end of the academic year but the symbolic beginning of a new cycle. Although the academic year officially begins with the fall semester, this time between commencement and the beginning of fall classes is a time to catch up on their research and plan and prepare for the year ahead.

Planning and preparation have never been more important than they are now. The president and the board of trustees have challenged the university family to achieve Top 20 status among public institutions. This exciting goal is achievable, yet cuts to our state funding will continue to challenge our budget, which really means challenging our ability to plan and prepare for the future and indeed to work toward Top 20 and other goals. Someone once said that a plan without a budget is just another daydream. That is certainly the case for us, as we cannot operate without the funds to support faculty, student services, laboratory equipment and the other essentials that make our program successful. We expect these challenges to continue indefinitely and to severely restrict our opportunities to move forward.

Yet we must continue to plan and prepare for the future. One of the most important areas of planning is the continuous scrutiny and development of the curriculum, at both undergraduate and graduate levels. We must provide a schedule of course work that challenges our students intellectually while providing the kinds of experiences that will prepare them for employment or for further study. It becomes increasingly challenging to provide both the critical level of basic course work and the flexibility to allow students to broaden their career opportunities. It is important that we hear from our alumni and friends in industry and in other fields so that we can fine-tune the curriculum creatively and effectively. We invite -- indeed urge -- you to communicate to us your thoughts and concerns about the profession and how we can continue to graduate students who are prepared to meet the challenges of their new beginnings. Email me at [jgoodwi@clemson.edu](mailto:jgoodwi@clemson.edu) or call me at 864-656-3055.



### Kudos to Dr. Husson



**Assistant Professor Scott Husson** has been recognized for excellence in both teaching and research.

In April he received the 2003 Byars Prize for Excellence in Teaching awarded each year by the College of Engineering and Science and was awarded the 2003 New Faculty Research Award by the Southeast Section of the American Society of Engineers in Education.

### Dr. Hirt Chairs ANTEC Technical Program

**Associate Professor Doug Hirt** was this year's Technical Program Chair for ANTEC, the Society of Plastics Engineers Annual Technical Conference held in Nashville, May 4-8. His duties included coordinating the paper-review process and session schedule for about 800 submitted papers distributed over 30 divisions and special interest groups in the Society. He also presented a paper at the conference, as did five members of his research group: **Ben Bolt** (M.S. student), **Amol Janorkar** (Ph.D. student), **Ning Luo** (post-doctoral associate), **Chip Swannack** (undergraduate), and **Keisha Walters** (Ph.D. student). **Professor Amod Ogale** and **Assistant Professor Graham Harrison** also had students present papers at the conference, including **Srinivas Cherukupalli** (Ph.D. student) and **Tianren Guo** (Ph.D. student). Hirt said, “The ChE department and the NSF Center for Advanced Engineering Fibers and Films were extremely well represented at ANTEC. The presentations from our department were outstanding and I was very proud of all our speakers.”



*Hirt, third from left, and his research group at ANTEC*

**Faculty**

Charles H. Barron, Jr., D.Sc.  
Polymer Reaction Engineering

David A. Bruce, Ph.D.  
Catalysis, Kinetics, Molecular Sieve Synthesis,  
and Molecular Modeling

Dan D. Edie, Ph.D.  
Director, Center for Advanced Engineering Fibers  
& Films  
Composite Materials, High-performance Fibers,  
Polymer Processing & Rheology

Charles H. Gooding, Ph.D.  
Membrane Separation Processes

James G. Goodwin, Ph.D.  
Department Chair  
Heterogeneous Catalysis, Kinetic Analysis of  
Surface Reactions, Characterization of Catalysts

Sarah W. Harcum, Ph.D.  
Biochemical Engineering; Protein Production

Graham M. Harrison, Ph.D.  
Fluid Mechanics & Non-Newtonian Flow

Douglas E. Hirt, Ph.D.  
Polymer Films

Scott M. Husson, Ph.D.  
Bioseparations and Separation Materials Synthesis

S. Michael Kilbey, Ph.D.  
Polymer Science; Surface Modification via Self-  
Assembly

Stephen S. Melsheimer, Ph.D.  
Automatic Control of Process Systems  
Associate Dean, Engineering & Sciences

Andrew T. Metters, Ph.D.  
Bioengineering; Polymer Science

Amod A. Ogale, Ph.D.  
Experimental & Modeling Issues Related to Fibers,  
Films & Composites

Richard W. Rice, Ph.D.  
Catalysis, Kinetics, & Chemical Reactors

Mark C. Thies, Ph.D.  
Thermodynamic and Supercritical Fluids

**Faculty Facts****Andrew T. Metters, Ph.D.**

The newest member of the Clemson Chem E faculty, Assistant Professor Andrew T. Metters, is bringing an exciting new aspect of research to the department with his focus on biomedical applications of polymers. But he says the old adage “Never say never” might apply to his career path.

“When I started out in chemical engineering, any time I was asked to state my areas of interest, I always said anything BUT biology. So of course that's what I'm doing now,” he explained. “I was interested in polymers and in looking at polymers for separations; I got into cross-linked and degradable polymers that have useful applications as biomaterials and biomedical implants. Now with the sequencing of the human genome and recent advances in microbiology, the lines are blurring between chemical engineering and the biological sciences.”

“That's the beauty of an engineering education,” he adds. “The principles of problem solving that are so much a part of engineering apply to other fields as well. You're given the basic tools and the ability to build what you want to build.”

After completing his Ph.D. at the University of Colorado, Metters spent a post-doc year in Switzerland with the Institute for Biomedical Engineering at the University of Zurich and the Swiss Federal Institute of Technology. He worked with other post docs and

graduate students on a number of bio-material technologies for improving biomimetic properties of synthetic polymers , making materials that would re- spond to cells as well as deliver drugs in controlled doses.

“For drug deliv- ery we focused on human growth hormone for treating dwarfism, exploring the develop- ment of a controlled re- ase device to eliminate the need for the multiple-injection treatments that are currently used. We also developed materials for improved wound healing and nerve regeneration. It was really an exciting work environment, with people from a wide range of disciplines working together in one lab, from polymer chemists to veterinary surgeons.”

Metters is excited about the atmosphere of interdisciplinary collaboration that exists at Clemson, and his work has already attracted the attention of other researchers here.

“Even before I arrived on campus, I was contacted by professors from other departments about our common research interests and possible collaborations, and I can see that the interest is definitely here. Traditional structures need to be overcome. That's how revolutionary advances are made in science and engineering, and that seems to be happening at Clemson.

“We get students interested in their class material by showing them how it's related to our outgoing research in the lab and to the exciting discoveries discussed on TV or in the newspapers. Most often they just don't realize what's possible. For example, my Transport students this semester were studying fluid flow. They understand that in terms of, say, oil flowing through a metal pipe, but they were surprised to learn that the same principles can be applied to understanding the flow of blood through our bodies.”

On a personal level, Metters and his wife, Betsy, are having to relearn some of the finer points of living in the South. After the cooler climes of Colorado and Switzerland, the North Carolina natives are struggling to adjust to life with bugs and humidity.

Learn more about Dr. Metters' research on his web page, <http://www.ces.clemson.edu/faculty/mitters>

**FACULTY FACTOIDS\***

Professors Charles Gooding and Steve Melsheimer have been lunchtime running companions for 23 years. Professor Mark Thies joined the pack 19 years ago. They estimate they have logged well over 50,000 miles collectively. Other faculty members join them on occasion, with Assistant Professor Andrew Metters the latest addition.

“We'll see if he sticks it out,” Gooding said.

\*Little-known tidbits of TOTALLY USELESS information about the Chem E faculty.

## HONORS & AWARDS

### Top Tigers



**Angela Manning** of Mauldin was honored as the department's top graduate, with a GPR of 3.89 out of a possible 4.0. Angela, who double majored in French, has worked summers, completed a co-op assignment AND cared for her six year old son while maintaining this excellent academic achievement. Angela will be working for Equistar Chemical in Houston, TX.



**Ryan Harris** of Simpsonville, SC, was recognized at the College of Engineering and Science's Honors and Awards Day as the student who completed the sophomore year with the highest scholastic average.



**Rebecca Presley** received a \$1,000 scholarship from the South Carolina Western Section AIChE. Presley, who graduated with honors, served as Clemson's AIChE student chapter president. She is employed as a process engineer by Equistar Chemical in Houston, TX.

**Azi Samadi** won a top award for her poster in the national AIChE undergraduate research competition. She also received the first place award for undergraduate research in the Clemson University Research Forum in March. We are pleased that Azi, who graduated in May, has elected to continue her research as a Master of Science student here in the department.



*December grads Gyo Park, left, and Alex Rhue*



*Dr Harrison's research group at the Thomas Green Clemson Academy banquet.*

## AIChE Officers



**Isabelle Beck**  
President



**Nathan Rainey**  
Vice President



**Anand Patel**  
Secretary



**Weijin Wang**  
Treasurer

## Chem E Family Album



*Dr. Rice with December grads Ron Holt and William Cason.*



*Our newest Ph.D., Dr. Anthony Cato, left, at December graduation with his advisor, Dr. Dan Edie.*



*Professor Husson with Thea Warringer at commencement*



*Dr. Barron with Bryan Anderson's family at May graduation.*



*Betsy Beach, center, with her family at the department's May graduation party.*



*L-R: Jim Goodwin, John Butt, Carol Goodwin and Regina Butt at the banquet.*



### His Blood Runneth Orange

**John Butt**'s affection for his undergraduate alma mater was evident in his remarks from the podium at his induction into the Thomas Green Clemson Academy Feb. 20.

This distinguished scientist and AIChE Fellow, who has advised 52 Ph.D. students, published more than 200 scientific papers, authored or co-authored 5 books, holds one patent and garnered numerous honors throughout his career, credits Clemson and particularly former department chair, the late **Charles Littlejohn** for setting him on the path to success. Going on to graduate school at Yale was not intimidating, despite its Ivy League reputation, because of the quality of his fundamental Chem E education at Clemson.

"We worked hard. Dr. Littlejohn made sure that the chemical engineers he sent out of here really knew their stuff," Butt said.

Butt's career has taken him all over the world, and he had not visited Clemson since he graduated until he and his wife, Regina, came through on a quick tour in the summer of 2000.

"I was really impressed," he said, noting with pride the beauty of the Clemson campus and the growth and quality of the academic program. Butt and Department Chair Jim Goodwin have known each other for years because of their common research interests in the area of catalysis, and when Goodwin returned to Clemson to head the department, Butt became reconnected. He spent two days visiting the department last fall, and he returned to meet with faculty informally at the time of his induction.

"We are thrilled that John has been recognized by the university for his many contributions to the profession," Goodwin said. We are even happier that we can call on him as an invaluable resource for the department. His distinguished academic career and his knowledge of chemical engineering education is a tremendous benefit for us. We look forward to his continuing involvement with the department in any way that he chooses."

### Words of Wisdom

Our thanks to alumni who spoke to our junior seminar students during the spring semester. **Richard Coats** B.S. '86, M.S. '90, of Albemarle, Inc., in Orangeburg, SC, talked to students about careers in the pharmaceutical industry. He also advised them on job search strategies and interviewing techniques.

Students also heard from two representatives of Fluor Corp. in Greenville, SC, about their group's work in the construction of bioengineering facilities. **Skeet Martin** '65 and **Scott Radford** '86 explained the role of chemical engineers in the design and construction of highly technical bioengineering plants and labs and discussed the various elective courses that would be appropriate for students interested in this career.

We welcome alumni at any time and are always interested in having our students learn firsthand from our graduates about the various career paths for chemical engineers. Please email **Dr. Goodwin** at [jgoodwi@clemson.edu](mailto:jgoodwi@clemson.edu) if you would be interested in talking with junior or senior students; we also invite you to drop by for a casual visit anytime.



L-R: **Dr. Goodwin** with **Skeet Martin** and **Scott Radford** following their presentation to students.



**Professor Mark Thies**, second from right, and **Dr. Gustavo Bolanos**, right, at the International Symposium on Supercritical Fluids in Versailles, France, with two of Dr. Bolanos' students.

Professor Bolanos obtained his Ph.D. at Clemson in 1995 under the guidance of Dr. Thies and joined the faculty of Universidad del Valle in Colombia to start a graduate program in Chemical Engineering. He has graduated seven M.S. students and at present has one Ph.D. and three master's students. The Ph.D. program started just two years ago.

### Class of '56 Meets in Charleston

Their numbers may be small but their Clemson connection is still strong! The members of the Chemical Engineering Class of 1956 met in Charleston this spring for a "mini-reunion." In addition to the inevitable 'dear old days' reminiscing, they report having a most interesting summary from each about their careers - sort of "what do chemical engineers do all day?" Well, the consensus was "almost anything."

Attending the event were **Dr. John Butt** of Prescott, AZ; **Mr. Louis Chaddick** of Wando, SC; **Mr. Ken Frick** of Columbia, SC; **Dr. William Leitner** of Birmingham, AL; **Mr. Barton Pattie, Jr.** of Ridgefield, CT and **Mr. Joe Shaw** of Georgetown, SC.

John Butt, who got the ball rolling for the reunion after a visit to Clemson in 2000, reports that the group is doing quite well. "I recognized everybody, which must mean that ChE is good for bodily trim and hair retention," he said. "We certainly have been blessed with interesting careers and we remember with fondness Charles E. Littlejohn and his devotion to our little class."

*Note: If your class is interested in a similar get-together, please let us know if we can be of assistance in locating classmates. The department and the university alumni office maintain records and various faculty members stay in touch with former students, so we may be able to help.*

## The Clemson-Yale Chem E Connection

Somewhere in the archives of Calhoun Residential College at Yale University there is a picture of Fort Hill, known affectionately by Clemson students, alumni and most South Carolina residents as “the Calhoun mansion.” Why this centerpiece of Clemson’s campus is also a part of Yale’s history has a lot to do with the Chemical Engineering department and everything to do with alumnus **John Butt** ’56.

Butt is one of five Clemson Ch E B.S. graduates who went on to pursue graduate study at Yale.

“**Angus Lander** and **Jack Leutwyler** from the Class of ’55 went first and ran interference for me,” Butt said. “I knew from their reports that we had been well prepared at Clemson, and that turned out to be the case. The work was challenging, but the Clemson men were up to it.”

Up to it indeed. After his graduation, Butt became a member of the Yale faculty and in that capacity also served as a resident fellow and Assistant Master at Calhoun Residential College, which is named for John C. Calhoun, who graduated from Yale in 1804. During his tenure at Yale, Butt presented the picture of Fort Hill, which hung in the college for several years, long enough to welcome two additional Clemson alumni who studied there, **Henry Savage** ’61 and **Clemson ChE Professor Richard Rice** ’68.



**John C. Calhoun**

“Henry remembers that after a little culture shock things smoothed out and he came to the conclusion that chemical engineering was pretty much the same north and south of the Mason-Dixon line,” Butt notes.

Dr. Rice remembers his time at the Ivy League school as challenging and stimulating without being overwhelming. “I never felt I was in over my head,” he said. “The curriculum was somewhat interdisciplinary and therefore included some course work that we had not covered in the undergraduate program at Clemson, so I had to work really hard on some of the unfamiliar areas, but that was the case for many of my fellow students, too. It was a great experience.”

During his recent visit to Clemson, Dr. Butt learned of the renovations to Fort Hill and got in touch with the current Master of Calhoun College, providing the web address so John C. Calhoun’s Yale family could see the spruced-up “Calhoun White House.”

Dr. William Sledge, who was not aware that Fort Hill is the centerpiece of the Clemson campus, expressed his appreciation for the information about the connection between the two schools and wrote a letter to President Barker congratulating the university on maintaining the Calhoun home in such a superb fashion.



### Clemson University Department of Chemical Engineering

Name \_\_\_\_\_ Class of \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone (Home) \_\_\_\_\_ (Office) \_\_\_\_\_ Email \_\_\_\_\_

Employer \_\_\_\_\_

Please contact me to speak to students about my career path.

Please accept my gift to support excellence in Chemical Engineering at Clemson.

Amount enclosed  \$25  \$50  \$100 Other \$ \_\_\_\_\_

The enclosed envelope is provided for your convenience and in order to direct your gift to the appropriate address.

Please make your check payable to **Clemson University Foundation** and write **Chemical Engineering** on the for line at the bottom left side of the check.

Thank you for your support.

## A Final Note

---



The two-year renovation of Fort Hill, the home of John C. Calhoun, whose son-in-law, Thomas Green Clemson, established the university, has been completed. Please visit Fort Hill soon to see the superb workmanship, and stop by Earle Hall while you're here! In the meantime, check the web site for more details: <http://www.clemson.edu/welcome/history/forthill/index.htm>

NON-PROFIT ORG.  
U.S. POSTAGE  
PAID  
CLEMSON, SC 29634  
PERMIT NO. 10

Department of Chemical Engineering  
127 Earle Hall  
Clemson University  
Clemson, SC 29634-0909